

# What is Axial shift of steam turbine?

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S.K. Mani, B.E. Mechanical Engineering, PSG College of Technology, Tamil Nadu, India (1964)

Answered Dec 7, 2017



- Steam turbine utilises Steam at high temperature to convert Thermal Energy to kinetic Energy for say Power generation or as a prime mover for other machines.
- The steam has an effect of expanding all parts of any machine by altering all dimensions.
- The rotor is also subject to axial thrust due to the flow of steam while in operation.
- Due to manufacturing clearances and Thermal expansion all parts (Both Stator and Rotors) are subject alteration of dimensions.
- These are different for different parts as materials of construction are different Mountings thrust and reactions also vary.
- To allow for this particularly most sensitive, Critical and costly part of Turbine is mounted carefully with one end fixed and the other end floating. Usually the floating has Complex Labyrinth seal to seal steam leakage to the minimum and a journal bearing to allow the expansion of the rotor and pressure oil sealing cum cooling system to take away heat, reduce steam leakage and prevent disaster.
- This permitted axial shifts also prevent even minor the bending of the rotor which will cause Severe vibrations which are extremely deleterious for the turbine installation and safety of the people working in the near and far vicinity.
- This phenomenon is called the axial shift of turbine and is closely monitored and the machine is tripped if any of the critical points is breached.
- I thought I would give you link that may be useful for you to learn about Turbines.

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Clark Bunch, worked at CVS Pharmacy  
Answered Jan 22



This question has been answered several times, not sure who is still “looking.”

The purpose of any turbine is to turn some force or pressure, such as wind, water or steam, into a rotational (torque) motion. In simplest terms it's like what an airplane propeller or boat impeller does in reverse. As force is applied to the blades of the turbine causing it to spin, some of that force will also act to push the shaft, at the axis of rotation, forward. Axial shift is the forward motion created by the applied force, in this case steam. It will be most noticeable during a pressure change, such as start up or shut down. A sudden change during what should be normal operation could be problematic.

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Santhosh R N, Mechanical and Aerospace Professional  
Answered Jun 22, 2016



Axial shift of a steam turbine is the shifting of turbine rotor in the forward and backward direction due to steam thrust on blades of rotor.

Reason is,

- Sudden change of load
- Sudden drop of vacuum

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Ashok Kumar, worked at Mechanical Engineering

Answered Aug 12, 2016



The Axial Shift is Nothing but the movement of turbine shaft in axial(X) direction. This is unavoidable in any steam turbines because of its operational constraints. When this Axial Shift is more than Certain limits,Turbine gets tripped. Each and Every Turbine manufacturer specifies their own limits. Axial Shift is usually arrested by Thrust bearing which is provided in the rear end of HP turbine.

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Nitesh Garg, Rotary Equipment Engineer. More then 8 years of experience

Answered Jul 11, 2016



Thanks for A2A. The axial shift of turbine basically refers to the axial shift of turbine rotor.

You would be aware the turbine rotor is subjected to pressure differential as at inlet pressure is more and at outlet it's less.

So because of pressure differential rotor has a tendency to shift at low pressure side which known as axial shift.

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 Upvote · 9 Share  Recommended [All](#)**Karthik Keyan**

Answered May 31, 2016



I think you are asking about axial displacement of turbine.

It is nothing but the high pressure steam enters at HP side of Turbine that is turbine rotor front end, due to this high pressure the rotor try to move towards the NDE of axially... This axially rotor shift is called axial shift or displacement...each turbine has a specific axial displacement values....

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